Alphabet: {*a*, *b*, *c*}

Probabilities: {0.7, 0.2, 0.1}.

Entropies: {0.51, 2.32, 3.32}

Sequence to be compressed: (*a*, *a*, *b*, *a*, *c*)

a. Total code length = 0.51 + 0.51 + 2.32 + 0.51 + 3.32 = 7.19 bits.
b. Redundancy is 0.81 bits as we have to round up to nearest integer value, which is 8 bits.
c. Huffman code: {0, 10, 11}, resulting to 0010011 = 7 bits.
d. Huffman code gives result lower than entropy, which should be impossible! The reason is that the model used is incorrect. The actual probabilities are {0.6, 0.2, 0.2} that would result to: $3 \cdot 0.73 + 2 \cdot 2.32$ = **6.85 bits**.